

Spokane Street Bridges

City of Seattle Response to Request for Information Regarding the Harbor Island Superfund Site, East Waterway Operating Unit

D. QUESTIONS

1. Identification and Association with Subject Property

- a. Provide the full legal name and mailing address of Respondent.

City of Seattle
c/o William Devereaux
Director, Environmental Management and Real Estate Division
Seattle City Light
700 5th Avenue, Suite 3316
P.O. Box 34023
Seattle, Washington 98124-4023

- b. For each person answering these questions on behalf of Respondent, provide that person's:
- i. full name;
 - ii. title;
 - iii. business address and electronic mail address; and
 - iv. business telephone number.

Anne Gettel
Senior Paralegal, Environmental Section
Seattle City Attorney's Office
701 Fifth Avenue, Suite 2050
Seattle, WA 98104-7095
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206-615-1317

- c. If Respondent wishes to designate an individual for receiving future correspondence from the EPA concerning the EWOU, please indicate so here by providing that individual's name, mailing address, electronic mail address, telephone number, and fax number.

Pete Rude
Senior Sediment Scientist
Seattle Public Utilities
700 5th Avenue, Suite 4900
Seattle, WA 98104-4018
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206-733-9179
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- d. Provide the address of each Subject Property, the time period when Respondent held any ownership or other interest in the Subject Property, and the type of interest held.

Since 1907, the City has been actively involved in the construction and maintenance of many bridges located in the Spokane St corridor located over the West Waterway and East Waterway. See response to 1.h. for details.

- e. Identify all materials used or created by Respondent's activities or operations at each Subject Property.

No materials are created at the Spokane St Bridges. When constructing and maintaining bridges, the City and its contractors are required to follow the guidance written in the bridge standard specifications and plans.¹ The City has located and provided bridge specifications from 1910 through the present.² Examples of materials used in bridge construction and maintenance activities are provided below.

Standard specifications from 1910 indicate that bridge superstructures and piles were constructed with timber.³ All points of contact between timbers (tops of piles and posts, and bearings of caps on piles) were coated with Carbonlineum Avenarius, an anthracene oil compound, or an alternative approved material.⁴ Caps on pile bents were "drift-bolted" and countersunk.⁵ The hole above the bolt was filled with hot pitch or asphalt.⁶

¹ Pers. Comm. w/K. Loo, 4/19/2022.

² SEA EWW_00025032-all, 1910 Standard Specifications; SEA EWW_00024785-all, 1911 Standard Specifications; SEA EWW_00024845-all, 1913 Standard Specifications; SEA EWW_00025078-all, 1919 Standard Specifications; SEA EWW_00025192-all, 1926 Standard Specifications; SEA EWW_00025301-all, 1932 Standard Specifications; SEA EWW_00025436-all, 1944 Standard Specifications; SEA EWW_00025575-all, 1963 Standard Specifications; SEA EWW_00025695-all, 1964 Standard Plans and Specifications; SEA EWW_00025895-all, 1967 Standard Plans and Specifications; SEA EWW_00026062-all, 1969 Standard Specifications; SEA EWW_00027832-all, 1970 Supplement to Standard Specifications; SEA EWW_00027764-all, 1970 Standard Plans; SEA EWW_00026213-all, 1975 Standard Specifications and Plans; SEA EWW_00027876-all, 1976 Supplement to Standard Specifications and Plans; SEA EWW_00026360-all, 1977 Standard Specs and Plans; SEA EWW_00027994-all, 1979 Supplement Standard Specifications and Plans; SEA EWW_00026893-all, 1984 Standard Specifications, 1986 edition; SEA EWW_00027110-all, 1989 Standard Specifications; SEA EWW_00028358-all, 1991 Standard Plans; SEA EWW_00038887-all, 2000 Standard Specifications; SEA EWW_00030132-all, 2003 Standard Specifications; SEA EWW_00028624-all, 2005 Standard Specifications; SEA EWW_00031013-all, 2008 Standard Specifications; SEA EWW_00029284-all, 2011 Standard Specifications; SEA EWW_00032833-all, 2014 Standard Specifications; SEA EWW_00033824-all, 2017 Standard Specifications.

³ SEA EWW_00025032, at SEA EWW_00025069 (38), 1910 Standard Specifications.

⁴ SEA EWW_00025032, at SEA EWW_00025069 (38), 1910 Standard Specifications.

⁵ SEA EWW_00025032, at SEA EWW_00025069 (38), 1910 Standard Specifications.

⁶ SEA EWW_00025032, at SEA EWW_00025069 (38), 1910 Standard Specifications.

1919 specifications indicate bridge superstructures were constructed of timber, and piles were treated with creosote.⁷ Road surfaces of bridges were coated with a “binder course” consisting of broken stone before an asphalt wearing surface containing cement, sand, and filler was applied on top.⁸

Specifications and correspondence from 1926 and 1932 indicate that bridges were constructed with timber or steel, and steel surfaces were painted.⁹ Road surfaces of bridges were coated with the same type of “binder course” and asphalt wearing surface identified in the 1919 specifications.¹⁰

In 1944, specifications noted that bridge hardware included nails, bolts, wire or boat spikes, washers, and dowels.¹¹

Specifications from 1969 indicate bridges were constructed of timber or steel. Joint sealer materials were applied to bridge joints, and caulking joint sealer was used on curb facings.¹² Drains, grates, and pipes were made of steel or iron. Pipes were “hot dipped zinc coated,” and drains and grates were coated with an asphaltum-based paint.¹³

The 1969 specifications also discuss painting of steel structures, including bridges. Timber bridges were given two to three coats of paint.¹⁴ See the 1969 specifications at SEA EWW_00026062, at SEA EWW_00026156-160 (95-99) for additional information on the general requirements for paint used on bridge structures. Mortar was used on the exposed surfaces of bridges.¹⁵ 1977 specifications provide the same requirements as detailed in the 1969 specifications.¹⁶

Bridge specifications from 1984 indicate the superstructure for all bridges included the following materials and structures: reinforced steel, concrete, prestressed concrete girders, deck slabs, earthquake restrainers, railing anchorage, concrete for precast and prestressed components, prestressing steel, expansion joints, inserts, compression seals, elastomeric pads, bridge drains with reducers, and electrical conduits/expansion fittings encased in concrete.¹⁷ Bridge approaches were epoxy-

⁷ SEA EWW_00025032, at SEA EWW_00025051 (20), 1910 Standard Specifications.

⁸ SEA EWW_00025078, at SEA EWW_00025168-169 (91-92), 1919 Standard Specifications.

⁹ SEA EWW_00025192, at SEA EWW_00025272-273 (81-82), 1926 Standard Specifications; SEA EWW_00025301, SEA EWW_00025392 (92), 1932 Standard Specifications; SEA EWW_00045885, at SEA EWW_00045886 (2), Cleaning & Painting of the West Spokane St Bridge No. 1, 1930.

¹⁰ SEA EWW_00025192, at SEA EWW_00025272-273 (81-82), 1926 Standard Specifications; SEA EWW_00025301, SEA EWW_00025392 (92), 1932 Standard Specifications.

¹¹ SEA EWW_00025436, at SEA EWW_00025454 (19), 1944 Standard Specifications.

¹² SEA EWW_00026062, at SEA EWW_00026149 (88), 1969 Standard Specifications.

¹³ SEA EWW_00026062, at SEA EWW_00026136 (75), 1969 Standard Specifications.

¹⁴ SEA EWW_00026062, at SEA EWW_00026159 (98), 1969 Standard Specifications.

¹⁵ SEA EWW_00026062, at SEA EWW_00026149 (88), 1969 Standard Specifications.

¹⁶ SEA EWW_00026360-all, 1977 Standard Specifications.

¹⁷ SEA EWW_00026676, at SEA EWW_00026751 (76), 1984 Standard Specifications, 1986 edition.

coated and included reinforcing bars , and concrete was used for roadway slabs.¹⁸ Bridge drains were made of cast steel. The drain castings and grates were coated with an asphaltum base black dipping paint."¹⁹

Specifications from 2003 indicate bridge approaches and decks were constructed with reinforced concrete.²⁰ Grout or adhesive was used to install the steel anchors for the bridge approaches.²¹ Concrete was used in underwater placement for shafts and bridge roadway slabs.²² Mortar paint was used on bridge surfaces.²³ Other specifications from the 2000s, including the most recent 2017 version, have the same information as detailed above.

Materials related to the Spokane St Bridges are also discussed in response to 1.h. and 1.m.

- f. Provide copies of all documents regarding the ownership or environmental conditions of the Subject Property, including, but not limited to, deeds, sales contracts, leases, surveys, investigations, sampling, reports, blueprints, "as-builts," and photographs.

Responsive documents have been produced and indexed.

- g. Provide information on the condition of the Subject Property when purchased or at the beginning of the relevant time period; describe the source, volume, and content of any fill used during the construction of the buildings, including waterside structures such as seawalls, wharves, docks, or marine ways.

In 1900, the tidal flats were filled at the mouth of the Duwamish River, where the Spokane Street Bridges are located.²⁴ Before filling began, the area between West Seattle and Beacon Hill was tidal flats and deltas with many small, shifting channels traversing the area.²⁵ Harbor Island was built between 1900 and 1909 using soil from lower Beacon hill and silt from the bottom of the Duwamish River.²⁶

- h. Describe the activities or operations at each Subject Property including:
 - i. the date such activities or operations commenced and concluded; and

See the response to h.ii. below.

¹⁸ SEA EWW_00026676, at SEA EWW_00026742, 748 (67, 73), 1984 Standard Specifications, 1986 edition.

¹⁹ SEA EWW_00026676, at SEA EWW_00026847 (172), 1984 Standard Specifications, 1986 edition.

²⁰ SEA EWW_00030132, at SEA EWW_00030370, 376 (239, 245), 2003 Standard Specifications.

²¹ SEA EWW_00030132, at SEA EWW_00030370 (239), 2003 Standard Specifications.

²² SEA EWW_00030132, at SEA EWW_00030370 (239), 2003 Standard Specifications.

²³ SEA EWW_00030132, at SEA EWW_00030390 (259), 2003 Standard Specifications.

²⁴ SEA EWW_00032346 (1), Harbor Island is completed, 2001.

²⁵ SEA EWW_00032346 (1), Harbor Island is completed, 2001.

²⁶ SEA EWW_00032346 (1), Harbor Island is completed, 2001.

- ii. the types of activities or operations performed at each Subject Property, including but not limited to the use, storage, or disposal of any materials in an outdoor location.

Beginning in the 1880s, a series of wood trestle bridges were constructed and stretched across the tidal flats from the shoreline at the base of Beacon hill to the shoreline below West Seattle.²⁷ Between 1900 and 1909, that area was filled, creating the East Waterway (EWW), the West Waterway (WWW), and Harbor Island.²⁸ After Harbor Island was created, bridges over the EWW and WWW were constructed for access to the Island.²⁹ See response to 1.g. for additional information regarding fill.

Between 1902 and the present, many bridges have been constructed in the Spokane St corridor. The table below lists bridge names, the waterway they span, the period of operation, and corresponding engineering plans.

Spokane St Bridges

Bridge Name	Waterway	Period of Operation	Engineering Plan(s)
Timber Trestles	Duwamish River and tide flats	1880s	Not available
Spokane St Bridge No. 1	Duwamish River and tide flats	1902-1907	Not available
Spokane St Bridge No. 2	Duwamish River and tide flats	1907-1917	Not available
Spokane St Bridge No. 3	West	1917-1925	SEA EWW_00024378-all
East Waterway North Bridge (aka SW Spokane St Bridge)	East	1918-Present	Not available
West Spokane St Bridge No. 1	West	1924-1976	SEA EWW_00015820-all; SEA EWW_00015912-all; SEA EWW_00014680-all; SEA EWW_00014516-all; SEA EWW_00015862-all
West Spokane St Bridge No. 2	West	1930-Sometime after 1981	SEA EWW_00016029-all; SEA EWW_00014680-all; SEA EWW_00014516-all
East Waterway South Bridge (aka SW Spokane St Bridge)	East	1928-Present *	SEA EWW_00015862, at SEA EWW_00015863 (2); SEA EWW_00014696-all; SEA EWW_00017580-all

²⁷ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012.

²⁸ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00032346 (1), Harbor Island is completed, 2001.

²⁹ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00032346 (1), Harbor Island is completed, 2001.

Bridge Name	Waterway	Period of Operation	Engineering Plan(s)
West Seattle Bridge (aka West Seattle High-level Bridge)	West and East	1984-2020	SEA EWW_00014869-all; SEA EWW_00014870-all; SEA EWW_00015514-all; SEA EWW_00015677-all; SEA EWW_00013492-all; SEA EWW_00013567-all; SEA EWW_00014156-all; SEA EWW_00014547-all; SEA EWW_00015732-all; SEA EWW_00016663-all
Spokane St Swing Bridge (aka West Seattle Low-level Bridge)	West	1991-Present	SEA EWW_00015791-all

Bridge Construction History

In 1902, King County constructed the first drawbridge, known as the Spokane St Bridge No.1, over the Duwamish Waterway connecting the shoreline at the base of Beacon hill to the shoreline below West Seattle.³⁰

In 1907, a new drawbridge was constructed in its place by the City.³¹ This bridge, known as the Spokane St Bridge No. 2, consisted of two spans of eighty feet and a 20-foot 4-inch roadway.³² In 1915, the bridge required new planking and approaches.³³ This bridge was extremely low and had to be opened many times for vessel traffic, which resulted in disrupted vehicle traffic.³⁴ For this reason, the City constructed a new “swing bridge” in its place.³⁵

In 1917, the City built a higher “swing bridge,” replacing the Spokane St Bridge No. 2.³⁶ This bridge was known as the Spokane St Bridge No. 3 (aka West Spokane St

³⁰ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00034886, at SEA EWW_00034948 (63), Public Works in Seattle, A Narrative History, 1978; SEA EWW_00036906 (1), King County builds first drawbridge over the Duwamish Waterway at Spokane St, 2001.

³¹ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00034886, at SEA EWW_00034948 (63), Public Works in Seattle, A Narrative History, 1978; SEA EWW_00023473, Second Spokane Street drawbridge constructed, 2001.

³² SEA EWW_00034886, at SEA EWW_00034948-949 (63-64), Public Works in Seattle, A Narrative History, 1978.

³³ SEA EWW_00034886, at SEA EWW_00034948 (63), Public Works in Seattle, A Narrative History, 1978.

³⁴ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012.

³⁵ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00024378, at SEA EWW_00024381-382 (4-5), West Spokane St Drawbridge, 1915.

³⁶ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00024378, at SEA EWW_00024381-382 (4-5), West Spokane St Drawbridge, 1915.

Drawbridge).³⁷ The 1917 swing bridge was equipped with two 115-foot spans.³⁸ This bridge, and those constructed before it, was built with timber and considered a temporary bridge.³⁹

In 1918, the East Waterway North Bridge (aka the SW Spokane St Bridge), was constructed over the EWW.⁴⁰ The bridge was 38 feet wide and constructed with timber stringers and piles braced with timber planks.⁴¹ The deck was paved with an asphalt surface.⁴²

In March 1924, the final approval and funds were made available to construct the West Spokane Street Bridge No. 1 bascule bridge over the WWW,⁴³ just north of the Spokane St Bridge No. 3.⁴⁴ By December 1924, the West Spokane Street Bridge No. 1 steel drawbridge was opened for use.⁴⁵

By 1925, the timber on the Third Spokane St Bridge was crumbling, and the bridge was deemed unsafe and closed for vehicle traffic.⁴⁶ The bridge was then only used by the Municipal Street Way for the operation of streetcars.⁴⁷ In 1928, the street cars were rerouted to the West Spokane Street Bridge No. 1.⁴⁸ The removal of the Third Spokane St Bridge and streetcar trestle began in 1928.⁴⁹

³⁷ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00024378, at SEA EWW_00024381-382 (4-5), West Spokane St Drawbridge, 1915.

³⁸ SEA EWW_00034886, at SEA EWW_00034948 (63), Public Works in Seattle, A Narrative History, 1978.

³⁹ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012.

⁴⁰ SEA EWW_00047973, at SEA EWW_00047977 (5) Replacement of EWW South Bridge, 1973.

⁴¹ SEA EWW_00047973, at SEA EWW_00047977 (5) Replacement of EWW South Bridge, 1973.

⁴² SEA EWW_00047973, at SEA EWW_00047977 (5) Replacement of EWW South Bridge, 1973.

⁴³ SEA EWW_00034886, at SEA EWW_00034949 (64), Public Works in Seattle, A Narrative History, 1978; SEA EWW_00027609 at SEA EWW_00027614 (6), 1924 Engineering Annual Report.

⁴⁴ SEA EWW_00034886, at SEA EWW_00034948 (63), Public Works in Seattle, A Narrative History, 1978.

⁴⁵ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00027609, at SEA EWW_00027623 (15), 1924 Engineering Annual Report.

⁴⁶ SEA EWW_00034886, at SEA EWW_00034950 (65), Public Works in Seattle, A Narrative History, 1978.

⁴⁷ SEA EWW_00034886, at SEA EWW_00034950 (65), Public Works in Seattle, A Narrative History, 1978.

⁴⁸ SEA EWW_00034886, at SEA EWW_00034951 (66), Public Works in Seattle, A Narrative History, 1978.

⁴⁹ SEA EWW_00024344, at SEA EWW_00024349-353 (6-10), Correspondence re removal of old Spokane St Drawbridge, 1928.

In 1928, a bridge known as the East Waterway South Bridge (aka SW Spokane St Bridge), which consisted of an asphalt concrete surface on timber planks, was constructed over the EWW, just south of the EWW north bridge.⁵⁰

In 1930, construction of the second bascule bridge, known as the West Spokane Street Bridge No. 2, was completed.⁵¹ In 1931, a contractor did additional work on the West Spokane Street Bridge No. 2 approaches.⁵² The West Spokane Street Bridges Nos. 1 and 2 were located adjacent to each other (No. 1 just north of No. 2) over the WWW.⁵³ Each bridge consisted of a bascule span with only one streetcar track on the south side of the bridge, and each was also equipped with separate concrete approaches for the car tracks.⁵⁴

By 1965, the timber piles on the East Waterway South Bridge were deteriorating and plans to replace the bridge began. Construction of the bridge was postponed in order to coordinate with the planning of the new West Seattle Freeway and improvements in the area.⁵⁵

In 1973, the current East Waterway South Bridge was constructed.⁵⁶ The bridge was constructed in three separate phases.⁵⁷ The EWW south bridge was constructed 57 feet wide and with a concrete structure and concrete piles.⁵⁸ The deck surface was paved with an asphaltic concrete overlay.⁵⁹

In 1976, the West Spokane Street Bridge No. 1 was hit by a freighter and was damaged to the point where it was permanently closed.⁶⁰ At this time, the City was conducting a study to build a bridge that was high enough that vessels could pass

⁵⁰ SEA EWW_00024392, at SEA EWW_00024394 (3), Correspondence re EWW South Bridge replacement, 1973; SEA EWW_00047973, at SEA EWW_00047977 (5), Replacement of EWW South Bridge, 1973.

⁵¹ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00034886, at SEA EWW_00034952 (67), Public Works in Seattle, A Narrative History, 1978; SEA EWW_00023284-all, West Spokane Street Bridge No. 2 photo, 1929; SEA EWW_00045619-all, West Seattle St Bridge No. 2 Superstructure & Machinery, 1930; SEA EWW_00045111-all, East Approach to West Spokane St Bridge No. 2, 1930.

⁵² SEA EWW_00045417-all, West Approaches to W Spokane St Bridge No. 2, 1931.

⁵³ SEA EWW_00023279-all, West Seattle Bridges Spokane Street photo, 1931.

⁵⁴ SEA EWW_00034886, at SEA EWW_00034952 (67), Public Works in Seattle, A Narrative History, 1978; SEA EWW_00045294-all, Street Railway Connection to West Seattle St Bridge No. 2, 1931.

⁵⁵ SEA EWW_00047973, at SEA EWW_00047977 (5), Replacement of EWW South Bridge, 1973.

⁵⁶ SEA EWW_00047973, at SEA EWW_00047977 (5), Replacement of EWW South Bridge, 1973.

⁵⁷ SEA EWW_00047973, at SEA EWW_00047978 (6), Replacement of EWW South Bridge, 1973.

⁵⁸ SEA EWW_00047973, at SEA EWW_00047978 (6), Replacement of EWW South Bridge, 1973.

⁵⁹ SEA EWW_00047973, at SEA EWW_00047978-979 (6-7), Replacement of EWW South Bridge, 1973.

⁶⁰ SEA EWW_00023508, at SEA EWW_00023509 (2), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00037834, Photo, damage to West Spokane Street Bridge No.1, 1978.

underneath the bridge without requiring a disruptive bridge opening.⁶¹ This event ultimately resulted in the planning and construction of the West Seattle Bridge.⁶²

Beginning in 1980, the City began planning for the construction of the West Seattle Bridge.⁶³ In 1981, the City entered into an agreement with King County for the construction of the West Seattle Bridge.⁶⁴ In 1984, the West Seattle Bridge was completed.⁶⁵ The bridge was constructed immediately south of and parallel to S.W. Spokane Street, crossing both the East and West Waterways and Harbor Island.⁶⁶

The 1981 agreement with King County also included the removal of the two bascule bridges; the West Spokane St Bridge No. 1 and the West Spokane St No. 2.⁶⁷ Two former reinforced concrete piers from the old bascule bridge No.1 were demolished with explosives using a new approach devised to protect the marine fisheries resources in the river.⁶⁸ “The contractor fabricated an air curtain using polyvinyl chloride pipe with drilled holes that was connected to high pressure air pumps and lowered into the water around each pier. The curtain of air produced is estimated to have absorbed up to 80 percent of the pressure wave created by each in-water blast.”⁶⁹

In 1991, the current Spokane St Bridge (aka Spokane St Swing Bridge) was constructed over the WWW, just north of the West Seattle bridge.⁷⁰ This bridge is a “cantilevered, post-tensioned, concrete, hydraulic, lift and turn bridge.” Two turning piers (Pier 6 and Pier 7) facilitate “lift and turn operations for each 7,000-ton moveable side of the bridge.”⁷¹ To open the bridge, a hydraulic slewing cylinder with a 24-inch diameter piston and 92-inch stroke rotate each moveable leaf to the full open

⁶¹ SEA EWW_00023508, at SEA EWW_00023509-510 (2-3), The Ten Bridges of the Spokane Street Corridor, 2012.

⁶² SEA EWW_00024336 (1), West Seattle Bridge Replacement Study fact sheet, 2021.

⁶³ SEA EWW_00046356-all, West Seattle Bridge Replacement, 1980.

⁶⁴ SEA EWW_00047901 (all), 1981 agreement between KC and City for construction of WSB, 1988.

⁶⁵ SEA EWW_00024336 (1), West Seattle Bridge Replacement Study fact sheet, 2021.

⁶⁶ SEA EWW_00047901, at SEA EWW_00047903 (3), 1981 agreement between KC and City for construction of WSB, 1988.

⁶⁷ SEA EWW_00047901 (all), 1981 agreement between KC and City for construction of WSB, 1988.

⁶⁸ SEA EWW_00038746, at SEA EWW_00038752 (7), World's only Hydraulically Operated Swing Bridge, 1991.

⁶⁹ SEA EWW_00038746, at SEA EWW_00038754 (9), World's only Hydraulically Operated Swing Bridge, 1991.

⁷⁰ SEA EWW_00023508, at SEA EWW_00023510 (3), The Ten Bridges of the Spokane Street Corridor, 2012; SEA EWW_00038746, at SEA EWW_00038749 (4), World's only Hydraulically Operated Swing Bridge, 1991.

⁷¹ SEA EWW_00024429, at SEA EWW_00024469 (41), CPRS Annual Report 2018.

position.⁷² The total weight of each box girder leaf is suspended on the hydraulic fluid of the lift-turn cylinder.⁷³

In 2013, structural cracks were observed on the West Seattle Bridge.⁷⁴ In March 2020, the West Seattle Bridge was closed by the City due to structural cracks on the portion of the bridge that crosses over the WWW.⁷⁵ The City has undertaken a long-term planning process to identify potential replacement ideas.⁷⁶ Presently, the upper West Seattle Bridge remains closed and the lower Spokane St Bridge is only open for limited use.⁷⁷

Bridge Repairs and Maintenance

The Spokane St Bridges were built at different times as described above and over the years have been widened and partially reconstructed when needed. Historical and current bridge repairs and maintenance activities are described below.

In 1915, the Spokane St Bridge No. 2 required new planking and approaches.⁷⁸ In 1924, “ordinary repairs” and maintenance to City bridges included replacing traffic gate arms and defective electrical equipment, cleaning and painting structural steel, and repairing the decks, approaches, trestles, and pier protections.⁷⁹ In 1930, the West Spokane St Bridge No. 1 was cleaned and painted.⁸⁰

In 1941, the East Waterway South Bridge was widened on the north side.⁸¹ In 1944, the timber piles on the East Waterway North Bridge were replaced, and the southside of the bridge was widened.⁸² In 1950, the timber deck of the north bridge was replaced with a concrete deck and surfaced with asphaltic concrete.⁸³

In 1956, maintenance to the two bascule bridges (the West Spokane St Bridge No. 1 and No. 2) included cleaning the steel decking and superstructures; steam-cleaning of

⁷² SEA EWW_00038746, at SEA EWW_00038757 (12), World's only Hydraulically Operated Swing Bridge, 1991.

⁷³ SEA EWW_00038746, at SEA EWW_00038757 (12), World's only Hydraulically Operated Swing Bridge, 1991.

⁷⁴ SEA EWW_00024530-all, Crack memo from John Clark, 2013.

⁷⁵ SEA EWW_00024193, at SEA EWW_00024198 (6), Final West Seattle High Bridge Replacement report, 2021; SEA EWW_00024336 (1), West Seattle Bridge Replacement Study fact sheet, 2021; SEA EWW_00024407-all, WSB monitoring system inspection summary, 2019.

⁷⁶ SEA EWW_00024397-all, Analyzing viable options to replace the bridge long-term, 2021.

⁷⁷ Pers. Comm. W/ K. Loo, 4/1/2022.

⁷⁸ SEA EWW_00034886, at SEA EWW_00034948 (63), Public Works in Seattle, A Narrative History, 1978.

⁷⁹ SEA EWW_00027609, at SEA EWW_00027620 (12), 1924 Engineering Annual Report.

⁸⁰ SEA EWW_00045885, at SEA EWW_00045886 (2), Bid 58576_Cleaning & Painting of the West Spokane St Bridge No. 1, 1930.

⁸¹ SEA EWW_00047973, at SEA EWW_00047978 (6), Replacement of EWW South Bridge, 1973.

⁸² SEA EWW_00047973, at SEA EWW_00047978 (6), Replacement of EWW South Bridge, 1973.

⁸³ SEA EWW_00047973, at SEA EWW_00047978 (6), Replacement of EWW South Bridge, 1973.

bridge gates, signals and signs, as well as railings and walls; and cutting and removal of brush debris from under the bridges.⁸⁴

In 1965, safety studs were added to the driving surface of the draw span gratings of the Spokane St Bridge.⁸⁵ In 1966, rectifiers were installed on the West Spokane St Bridge No. 1.⁸⁶ In 1967, the West Spokane St Bridge No. 2 was cleaned and repainted, and in 1969 the approaches of the bridge were repaired.⁸⁷ Painting activities included the removal of rust scale, dead paint, dirt, grease or other foreign matter from the metal bridge parts prior to the application of paint.⁸⁸

In 1976, general bridge maintenance activities included repairing railings, cleaning storm drains; repairing, and building stairs and fences; and painting pipes and wood railings.⁸⁹ Painting steel and other metal on bridges protects them from rust and corrosion.⁹⁰

In 1989, 118 bridge inspections were conducted.⁹¹ 160 bridge inspections were conducted in both 1990 and 1991.⁹² These bridge inspections, as well as inspections conducted at later dates, identified maintenance work and/or repairs that needed to be done to the Spokane St Bridge and West Seattle Bridge.⁹³ The Seattle Department of Transportation has retained copies of work orders for the Spokane St Bridge and West Seattle bridge dating back to 1980.⁹⁴

Work orders from 1980 to the present identify repairs and other maintenance activities completed on the bridges. Examples of specific repairs and maintenance during those years included sanding, priming and painting the bridge “deck,” cleaning and painting other portions of the bridge, insulating the hydraulic tanks, and removing debris from bridge storm drains. In addition, a range of repairs and replacements to minor and major bridge equipment were completed similar to those described above. See the work orders at SEA EWW_00038742 and SEA EWW_00038744 for additional details.

⁸⁴ SEA EWW_00027676, at SEA EWW_00027678 (3), 1956 Engineering Annual Report.

⁸⁵ SEA EWW_00027711, at SEA EWW_00027713 (3), 1965 Engineering Annual Report.

⁸⁶ SEA EWW_00027729, at SEA EWW_00027733 (5), 1966 Engineering Annual Report.

⁸⁷ SEA EWW_00027738, at SEA EWW_00027739 (2), 1967 Engineering Annual Report; SEA EWW_00014680-all, Repair of Bridge Approaches engineering plan, 1969.

⁸⁸ SEA EWW_00026062, at SEA EWW_00026159 (98), 1969 Standard Specifications.

⁸⁹ SEA EWW_00027862, at SEA EWW_00027865 (4), 1976 Engineering Annual Report.

⁹⁰ SEA EWW_00036139, Website, SDOT Bridges, printed 4/5/2022.

⁹¹ SEA EWW_00027990, at SEA EWW_00027992 (3), 1990 Engineering Annual Report.

⁹² SEA EWW_00027990, at SEA EWW_00027992 (3), 1990 Engineering Annual Report.

⁹³ Pers. Comm. W/ K. Loo, 4/1/2022.

⁹⁴ Pers. Comm. W/ K. Loo, 4/1/2022; SEA EWW_00038742, Work orders for the Spokane St Bridge, 1987-2010; SEA EWW_00038744, Work orders for the West Seattle Bridge, 1987-2010. SEA EWW_00038744, Work orders for the West Seattle Bridge, 1987-2010.

The City conducts regular preventative maintenance activities and monthly routine bridge inspections.⁹⁵ Examples of preventative maintenance and inspection activities conducted on the Spokane St Bridge include the following:

- Inspecting the hydraulic tank and hydraulic pump (motors and hoses);⁹⁶
- Inspecting the extension and retraction of the hydraulic cylinders as well as checking for any leaks or damage;⁹⁷
- Inspecting to see if there are leaks in drain lines;⁹⁸
- Inspecting the pressure relief valve to make sure the pressure settings are correct;⁹⁹
- Inspecting the directional control valves;¹⁰⁰
- Inspecting the shut off valve for leaks and that it is working properly;¹⁰¹
- Inspecting filters to make sure they are not clogged;¹⁰² and
- Inspecting the overall condition of the traffic gates, barrier gates, and pedestrian gates.¹⁰³

No materials are stored in outdoor locations. Materials used and/or handled related to the Spokane St Bridges are also discussed in responses to 1.e. and 1.m.

- i. Describe each release of materials at or from a Subject Property, including the type and quantity of the materials, the location of the release, the impacted media, and the response.

The City has no information on releases that occurred on the bridges prior to 2006. The following releases have been identified between 2006 and 2021:

2006: A vehicle accident occurred on the West Seattle Bridge, releasing approximately three quarts of oil.¹⁰⁴ No information on clean-up activities is available.

2008: An unknown dust was observed coming off of a car crossing the West Seattle bridge.¹⁰⁵ No additional information is available.

2010: A vehicle accident occurred on the West Seattle Bridge releasing approximately one-fourth of a gallon of antifreeze.¹⁰⁶ No information on clean-up activities is available.

⁹⁵ Pers. Comm. w/K. Loo, 4/1/2022.

⁹⁶ SEA EWW_00038458, at SEA EWW_00038458-460 (1-3), Blank Spokane St Bridge inspection, n.d.

⁹⁷ SEA EWW_00038458 (1), Blank Spokane St Bridge inspection, n.d.

⁹⁸ SEA EWW_00038458 (1), Blank Spokane St Bridge inspection, n.d.

⁹⁹ SEA EWW_00038458 (1), Blank Spokane St Bridge inspection, n.d.

¹⁰⁰ SEA EWW_00038458 (1), Blank Spokane St Bridge inspection, n.d.

¹⁰¹ SEA EWW_00038458 (1), Blank Spokane St Bridge inspection, n.d.

¹⁰² SEA EWW_00038458 (1), Blank Spokane St Bridge inspection, n.d.

¹⁰³ SEA EWW_00038458, at SEA EWW_00038462 (5), Blank Spokane St Bridge inspection, n.d.

¹⁰⁴ SEA EWW_00038596-all, West Seattle Bridge spill report, 2006.

¹⁰⁵ SEA EWW_00024644-all, West Seattle Bridge spill report, 2008.

¹⁰⁶ SEA EWW_00038598-all, West Seattle Bridge spill report, 2010

2011: A fisherman dumped trash on the SW Spokane St bridge.¹⁰⁷ No additional information is available.

2014: A vehicle accident occurred on the West Seattle Bridge releasing approximately five quarts of motor oil.¹⁰⁸ Absorbents were used to clean up the oil and placed in a drum for disposal.¹⁰⁹

2014: The Seattle Fire Department reported a release of approximately 80 gallons of fuel from a tank truck on the West Seattle Bridge.¹¹⁰

2015: Approximately 5 to 6 gallons of coolant was released from a bus on the Spokane St offramp.¹¹¹ A King County Metro spill response team responded to the release.¹¹² The coolant on the bridge was unrecoverable.¹¹³

2017: Ten gallons of coolant was released from a bus on the SW Spokane St Bridge. King County cleaned the spill and disposed of the waste.¹¹⁴

2017: Approximately 3 gallons of coolant was released from a bus on the West Seattle Bridge. King County cleaned up the spill and disposed of the waste. The storm drains were not impacted.¹¹⁵

2018: Oil was reportedly spilled on the West Seattle Bridge near the Delridge Way exit.¹¹⁶ The spill response team was unable to stop and inspect the spill due to traffic.¹¹⁷ No oil containers or recoverable oil was visible, and no oil reached the drainage system.¹¹⁸

2019: Approximately five gallons of fuel spilled on the West Seattle Bridge and entered catch basins that connect to a combined sewer system.¹¹⁹ No remediation actions were taken.¹²⁰

¹⁰⁷ SEA EWW_00038014-all, SW Spokane St Bridge spill report, 2011.

¹⁰⁸ SEA EWW_00038612-all, West Seattle Bridge spill report, 2014.

¹⁰⁹ SEA EWW_00038612-all, West Seattle Bridge spill report, 2014.

¹¹⁰ SEA EWW_00024637-all, West Seattle Bridge spill report, 2014.

¹¹¹ SEA EWW_00024617-all, Spokane St Bridge spill report, 2015.

¹¹² SEA EWW_00024617-all, Spokane St Bridge spill report, 2015.

¹¹³ SEA EWW_00024617-all, Spokane St Bridge spill report, 2015.

¹¹⁴ SEA EWW_00024625-all, SW Spokane St Bridge spill report, 2017.

¹¹⁵ SEA EWW_00038054-all, West Seattle Bridge spill report, 2017.

¹¹⁶ SEA EWW_00024425-all, West Seattle Bridge spill report, 2018.

¹¹⁷ SEA EWW_00024425-all, West Seattle Bridge spill report, 2018.

¹¹⁸ SEA EWW_00024425-all, West Seattle Bridge spill report, 2018.

¹¹⁹ SEA EWW_00024423-all, West Seattle Bridge spill report, 2019.

¹²⁰ SEA EWW_00024423-all, West Seattle Bridge spill report, 2019.

2019: “SDOT reported Vehicle fluids leaking into Storm drain on West Seattle Bridge (E of Admiral Way SW) from [a] Vehicle Accident.”¹²¹

2020: A vehicle accident occurred on the ramp to the West Seattle Bridge, causing a release of auto fluids (oil and coolant) to the roadway and a catch basin.¹²² The fluids ran under the bridge and down to a catch basin under the bridge structure.¹²³ The catch basin was equipped with a trap and connected to a large oil/water separator.¹²⁴ The river was checked upstream and downstream in the area of the release and no fluids were observed in the waterway.¹²⁵

2021: A vehicle accident occurred on the Lower Spokane Street Bridge releasing approximately one gallon of antifreeze.¹²⁶ One bag of Greensweep (a type of absorbent) was applied to the spill.¹²⁷ No additional information is available.

- j. Provide information on past dredging or future planned dredging in the EWOU.

The City dredged a portion of the WWW prior to the construction of the West Seattle Bridge.¹²⁸ No other dredging records have been located related to dredging conducted by the City, but it is likely that portions of the WWW and EWW were dredged during the construction of other bridges in the Spokane St corridor.

- k. Provide all documents pertaining to the use, storage, or disposal of any hazardous substances, pollutants, or contaminants at the Subject Property.

Responsive documents have been produced and indexed.

- l. Provide all information on electrical equipment used at the Subject Property, including transformers or other electrical equipment that may have contained polychlorinated biphenyls (PCBs).

The City found no written records regarding transformers on the Spokane St Bridges. However, because movable bridges (E.g., West Spokane St Bridge swing bridge) have transformers, it is likely that the bridge equipment included one or more transformers.¹²⁹ Transformers on movable bridges are smaller than pole-top transformers.¹³⁰

¹²¹ SEA EWW_00024427-all, West Seattle Bridge spill report, 2019

¹²² SEA EWW_00024417-all, West Seattle Bridge spill report, 2020.

¹²³ SEA EWW_00024417-all, West Seattle Bridge spill report, 2020.

¹²⁴ SEA EWW_00024417-all, West Seattle Bridge spill report, 2020.

¹²⁵ SEA EWW_00024417-all, West Seattle Bridge spill report, 2020.

¹²⁶ SEA EWW_00036927-all, Spokane St Bridge spill report, 2021.

¹²⁷ SEA EWW_00036927-all, Spokane St Bridge spill report, 2021.

¹²⁸ SEA EWW_00044225, at SEA EWW_00044401 (177), Port records and correspondence, 1983-1985.

¹²⁹ Pers. Comm. w/K. Loo, 4/12/2022.

¹³⁰ Pers. Comm. w/K. Loo, 4/12/2022.

- m. Provide information on the type(s) of oils or fluids used for lubrication of machinery or other industrial purposes, and any other chemicals or products which are or may contain hazardous substances, pollutants, or contaminants which are or were used at the Subject Property.

When constructing and maintaining bridges, the City and its contractors are required to follow the guidance written in the bridge standard specifications and plans.¹³¹

Examples of materials and hazardous substances identified in the bridge specifications include the following:

- Timber treated with creosote;¹³²
- Timber coated with Carbonlineum Avenarius, an anthracene oil compound;¹³³
- Holes from countersunk bolts were filled with hot pitch or asphalt;¹³⁴
- Road surfaces on the bridge used an “asphalt wearing surface;”¹³⁵
- Joint sealer materials and caulking joint sealers were used on bridges;¹³⁶
- Steel pipes used on bridge drains were “hot dipped zinc coated;”¹³⁷
- Both drain castings and grate covers were coated inside and out with an asphaltum base black dipping paint;¹³⁸
- Paints were used on steel structures, railings, and timber structures;¹³⁹
- Mortar was used on the exposed surfaces of bridges;¹⁴⁰ and
- Bridge approaches were epoxy coated;¹⁴¹

Additional details on the abovementioned materials and hazardous substances used in bridge construction and maintenance activities, and other non-hazardous materials used in bridge infrastructure, are discussed in response to 1.e.

Since 1991, hydraulic fluid has been used in the operation to open the Spokane St Bridge.¹⁴²

¹³¹ Pers. Comm. w/K. Loo, 4/19/2022.

¹³² SEA EWW_00025078, at SEA EWW_00025097 (20), 1919 Standard Specifications.

¹³³ SEA EWW_00025032, at SEA EWW_00025069 (38), 1910 Standard Specifications.

¹³⁴ SEA EWW_00025032, at SEA EWW_00025069 (38), 1910 Standard Specifications.

¹³⁵ SEA EWW_00025192, at SEA EWW_00025272-273 (81-82), 1926 Standard Specifications; SEA EWW_00025301, at SEA EWW_00025392 (92), 1932 Standard Specifications.

¹³⁶ SEA EWW_00026062, at SEA EWW_00026149 (88), 1969 Standard Specifications.

¹³⁷ SEA EWW_00026062, at SEA EWW_00026136 (75), 1969 Standard Specifications.

¹³⁸ SEA EWW_00026062, at SEA EWW_00026136 (75), 1969 Standard Specifications.

¹³⁹ SEA EWW_00026062, at SEA EWW_00026159 (98), 1969 Standard Specifications.

¹⁴⁰ SEA EWW_00026062, at SEA EWW_00026149 (88), 1969 Standard Specifications.

¹⁴¹ SEA EWW_00026676, at SEA EWW_00026742, 748 (67, 73), 1984 Standard Specifications, 1986 edition.

¹⁴² SEA EWW_00038746, at SEA EWW_00038757 (12), World's only Hydraulically Operated Swing Bridge, 1991.

In 2021, an asbestos and lead Survey for “West Seattle Corridor Bridge Rehabilitations Project” was conducted.¹⁴³ A total of 229 samples, only two detected asbestos: one on the Spokane St Bridge, and one on the West Seattle Bridge.¹⁴⁴

Other hazardous substances and products currently used in bridge maintenance activities include Gloss Green Oil Base Brushing Enamel, thinner for Oil Base Brushing Enamel, high temperature lubricant, contact adhesive, non-chlorinated brake parts cleaner, Chevron Open Gear Grease, gutter and flashing sealant, caulking compound, lubricants, casing grout, adhesive remover, graffiti remover, heavy duty degreaser, greaseless lubricant, and other cleaners and disinfectants.¹⁴⁵

- n. Provide any Subject Property drainage descriptions plans or maps that include information about storm drainage which includes, but is not limited to, above or below surface piping, ditches, catch basins, manholes, and treatment/detention or related structures including outfalls. If available, also include information about connections to each sanitary sewer.

The City has not located any drainage information for the Spokane St Bridges between 1902 and the 1920s.

Between the 1920s and the mid-1980s, stormwater from the West Spokane St Bridge No.1, West Spokane St Bridge No. 2, and the SW Spokane St Bridge (which includes the East Waterway North Bridge and East Waterway South Bridge) was collected and transported in small storm sewer systems along the Spokane St corridor and ultimately discharged into the WWW and EWW via multiple City outfalls.¹⁴⁶

Since the mid-1980s, stormwater from the West Seattle Bridge, West Spokane St Bridge and the SW Spokane St Bridge discharges to the EWW and the WWW via two City

¹⁴³ SEA EWW_00027321-all, Asbestos and Lead Survey, 2021.

¹⁴⁴ SEA EWW_00027321, at SEA EWW_00027323, 326, 331 (3, 6, 11), Asbestos and Lead Survey, 2021.

¹⁴⁵ SEA EWW_00018606-all, #1124 Gloss Green Oil Base Brushing Enamel, 2019; SEA EWW_00018614-all, #1148 Thinner For Oil Base Brushing Enamel, 2019; SEA EWW_00018649-all, 1250 ALMASOL High Temperature Lubricant, 2021; SEA EWW_00020199-all, Bostik Contact Adhesive, 2020; SEA EWW_00020241-all, Brakleen Brake Parts Cleaner, 2020; SEA EWW_00020337-all, Chevron Open Gear Grease, 2020; SEA EWW_00022392-all, Gutter and Flashing Sealant, 2019; SEA EWW_00022414-all, DAP DYNAFLEX 230, 2020; SEA EWW_00022444-all, Dry Moly Lube, 2019; SEA EWW_00022460-all, Pipe Lubricant, 2019; SEA EWW_00022486-all, Five Star MineForm Casing Grout, 2020; SEA EWW_00022486-all, Five Star Structural Concrete, 2020; SEA EWW_00022801-all, Goof Off Gunk & Adhesive Remover, 2019; SEA EWW_00022811-all, Graffiti Remover, 2019; SEA EWW_00022908-all, HydroForce Super Citrus Heavy Duty Degreaser, 2019; SEA EWW_00023016-all, Lysol Brand IC Quaternary Disinfectant Cleaner, 2020; SEA EWW_00020186-all, Antibacterial Wipes, 2019.

¹⁴⁶ SEA EWW_00024096, at SEA EWW_00024096_0098 (99), West Seattle Bride Final Enviro Impact Statement, 1979.

outfalls.¹⁴⁷ Stormwater is collected in a series of catch basins on the bridge, flows into downspouts connected to the bridge piers, discharges to drainage pipes in the street, and then discharges to either the WWW via a 96-inch outfall, or to the EWW via a 24-inch outfall.¹⁴⁸

- o. With respect to past activities or operations at each Subject Property, provide copies of any stormwater or drainage studies, including data from sampling, conducted at the Subject Property. Also provide copies of any Stormwater Pollution Prevention or Maintenance Plans or Spill Plans that may have been developed for different operations during Respondent's occupation of the Subject Property.

Responsive documents have been produced and indexed.

- p. Describe each underground storage tank present at any time on a Subject Property, including but not limited to the size and location of the tank, the materials stored in the tank, the time period of use, whether any material leaked from the tank, the type and quantity of leaked material, and the response to the leaked material.

No underground storage tanks are associated with the Spokane St Bridges.

- q. Provide the names and last known address of any tenants or lessees, the dates of their tenancy and a description of the activities or operations they conducted while present at the Subject Property.

No tenants or lessees are associated with the Spokane St Bridges.

- r. If Respondent, its parent corporation, subsidiaries or other related or associated companies have filed for bankruptcy, provide:
 - i. the U.S. Bankruptcy Court in which the petition was filed;
 - ii. the docket numbers of such petition;
 - iii. the date the bankruptcy petition was filed;
 - iv. whether the petition is under Chapter 7 (liquidation), Chapter 11 (reorganization), or other provision; and
 - v. a description of the current status of the petition.

The Respondent, City of Seattle, has not filed for Bankruptcy.

- s. If not already provided, identify and provide a last known address or phone number for all persons, including Respondent's current and former employees or agents, other than attorneys, who have knowledge or information about the generation, use,

¹⁴⁷ SEA EWW_00024664, Spokane St Bridge drainage EWW, 2022; SEA EWW_00024665, Spokane St Bridge drainage WWW, 2022; Pers. Comm. w/M. Cawrse, 3/11/2022.

¹⁴⁸ SEA EWW_00024664, Spokane St Bridge drainage EWW, 2022; SEA EWW_00024665, Spokane St Bridge drainage WWW, 2022; Pers. Comm. w/M. Cawrse, 3/11/2022.

purchase, storage, disposal, placement, or other handling of hazardous substances, pollutants, or contaminants, or transportation of hazardous substances, pollutants, or contaminants to or from, the Subject Property.

Jill Macik

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